

Bacular variation in the subgenus *Trinomys*, genus *Proechimys* (Rodentia: Echimyidae)

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Receipt of Ms. 15. 5. 1991
Acceptance of Ms. 16. 9. 1991

Abstract

Bacular morphology and variation in the four species of spiny rats of the subgenus *Trinomys*, genus *Proechimys* is described. Each species can be uniquely diagnosed on the basis of bacular morphology alone. *Proechimys dimidiatus* and *P. iberingi* have similar overall bacular morphology, although they differ noticeably from *P. setosus* and *P. albispinus*. The latter two species differ markedly in the morphology of the baculum.

Introduction

The spiny rats included in the subgenus *Trinomys* Thomas, genus *Proechimys* Allen, occur in eastern Brazil from the state of Bahia to the state of São Paulo. According to MOOJEN (1948) four species are recognized in the subgenus *Trinomys*: *P. dimidiatus* (Günther), *P. iberingi* Thomas, *P. setosus* (Desmarest), and *P. albispinus* (Geoffroy). These species can be diagnosed on the basis of a combination of traits that include the size, shape, and color of aristiform hairs, morphology of the skull, and pattern of cheekteeth counterfolds (MOOJEN 1948), although substantial overlap in the distribution of character states among the species makes identification a rather difficult task. To date there have been no studies of bacular morphology in the subgenus *Trinomys*. In this note we describe bacular morphology and variation in the four species of the subgenus *Trinomys*.

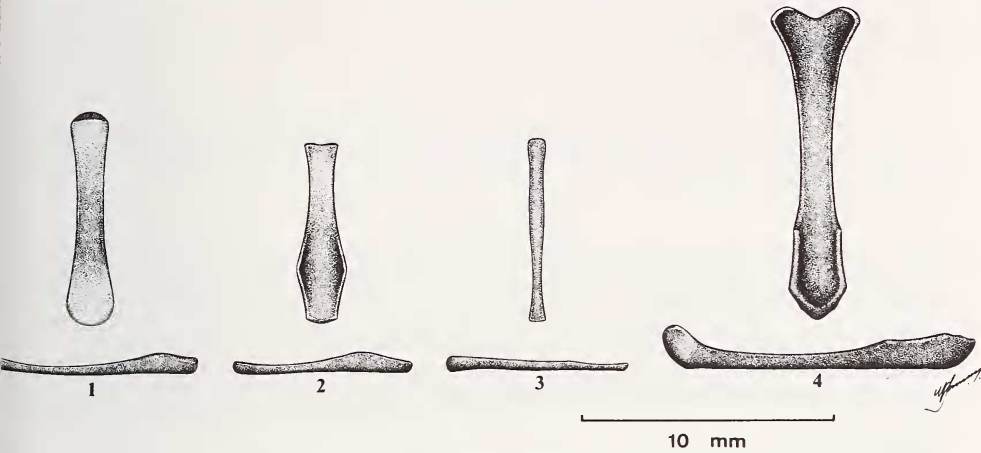
Material and methods

The specimens employed in this study were identified using a combination of pelage and skull traits described by MOOJEN (1948). Phalli were removed from skins of preserved specimens deposited in the mammal collection of the Museu Nacional (UFRJ) and immersed in water for 24 hours. Bacula were dissected from surrounding tissues under the binocular microscope. Only adult specimens, age classes 8–10 of PATTON and ROGERS (1983), were used in this study. The following samples were examined: *P. dimidiatus* (state of Rio de Janeiro: Tijuca [n = 5]); *P. iberingi* (state of Espírito Santo: Santa Teresa [n = 5]); *P. setosus* (state of Minas Gerais: Juiz de Fora [n = 2]), Peti [n = 1], Lagoa Santa [n = 1]); *P. albispinus* (state of Bahia: Jaguaquara [n = 1], Jequié [n = 4]).

Results and discussion

The baculum in the subgenus *Trinomys* is an elongate and narrow structure with a straight shaft (see Figure and Table). This structure varies, however, in the shape of the proximal and distal ends and in the development of the dorsoventral curvature. In *P. dimidiatus* the shaft does not show any development of a dorsoventral curvature but it has a lateral indentation near mid-shaft. The proximal and distal ends are evenly round, and the latter

shows no development of apical wings or median depression. In *P. iberingi* the shaft has a slight dorsoventral curvature in the proximal third, and shows an indentation near the distal end. The distal end is slightly concave and has no apical wings or median depression. The shaft broadens near the proximal end and is tapered in the tip. The baculum in *P. setosus* does not show a dorsoventral curvature and has a lateral indentation near the posterior tip. The proximal and distal ends are nearly square. The proximal end is slightly paddle-shaped and the distal end has no apical wings or median depression. In *P. albispinus* the baculum has a dorsoventral curvature and slightly tapered lateral indentations near mid-shaft. The proximal end is paddle-shaped and pointed. The distal end has well developed apical wings with a pronounced median depression (Figure).



Ventral (A) and lateral (B) views of bacula of species of the subgenus *Trinomys*, genus *Proechimys*. The distal part is put to the top (ventral view) and left (lateral view). 1: *P. dimidiatus*, 2: *P. iberingi*, 3: *P. setosus*, 4: *P. albispinus*

Four measurements were taken from bacula of the four species and are shown in Table 1. *Proechimys dimidiatus*, *P. iberingi*, and *P. setosus* bacula are similar in greatest length of shaft (Table). These species are also similar in body size (MOOJEN 1948). On the other hand, *P. albispinus* has the smallest body size among the species of *Trinomys* (MOOJEN 1948) but it has the largest baculum.

Overall bacular morphology is similar in both *P. dimidiatus* and *P. iberingi* although their bacula differ noticeably from those of *P. setosus* and *P. albispinus*. The latter two species also differ markedly in bacular morphology. MOOJEN's (1948) assessment of specific variation in the subgenus *Trinomys* revealed several cranial characters shared by *P. dimidiatus* and *P. iberingi* and by *P. setosus* and *P. albispinus*. He actually implied a close morphological relationship between *P. dimidiatus* and *P. iberingi*. The morphological

Means and (standard deviations) for measurements taken from bacula of the four species of *Proechimys* of the subgenus *Trinomys*

Characters	Taxon			
	<i>P. dimidiatus</i> (n = 5)	<i>P. iberingi</i> (n = 5)	<i>P. setosus</i> (n = 4)	<i>P. albispinus</i> (n = 5)
Greatest length of shaft	7.6 (0.57)	6.7 (0.61)	7.4 (0.21)	11.4 (0.65)
Maximum width of proximal end	1.8 (0.19)	1.7 (0.15)	0.6 (0.10)	2.0 (0.05)
Maximum width of distal end	1.4 (0.19)	1.2 (0.13)	0.8 (0.06)	3.1 (0.29)
Least width of shaft	0.9 (0.12)	0.8 (0.11)	0.5 (0.00)	1.1 (0.15)

similarity found by MOOJEN (1948) for the latter species is indeed corroborated by bacular morphology. On the other hand, the similarity between *P. setosus* and *P. albispinus* established on the basis of cranial morphology (MOOJEN 1948) is not supported by bacular morphology.

PATTON (1987) recently reviewed morphological variation and systematics in the subgenus *Proechimys* and showed that the baculum can be either long and narrow or massively long and broad. PATTON (1987) also showed that bacular morphology in addition to skull morphology allowed the definition of nine groups of species in the subgenus *Proechimys*. We showed here that each species in the subgenus *Trinomys* can be uniquely diagnosed by the morphology of the baculum. We believe this is an important result because the degree of distinctiveness in bacular morphology among species of *Trinomys* is not matched by the amount of variation known to exist in the skull and pelage. The skull and pelage have traditionally been employed in the taxonomy of the subgenus *Trinomys*, but have not always allowed correct identification of taxa. It should also be pointed out that, whereas in the subgenus *Proechimys* the baculum can be useful to define groups of species (PATTON 1987), in the subgenus *Trinomys* this structure is diagnostic at the species level.

Acknowledgments

We are indebted to Prof. J. F. DA CRUZ and Dr. ULISSES CARAMASCHI, Museu Nacional, UFRJ, for allowing us to examine specimens under their care. We are also indebted to Dr. G. FONSECA and G. HERMANN, Universidade Federal de Minas Gerais, for the donation of one specimen used in this study. J. R. SOMERA made the drawings of the bacula. Research supported by funds from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (E-29/170.339/90), Fundação de Amparo à Pesquisa do Estado de São Paulo (88/2237-4, 89/0772-1, 89/3405-0). Work by SFR is partially supported by a research fellowship from (CNPq). LMP is partially supported by fellowship from Programa de Incentivo a Capacitação Docente (UFRJ).

Zusammenfassung

Baculumvariation im Subgenus Trinomys, Genus Proechimys (Rodentia: Echimyidae)

Morphologie und Variation von Bacula werden für 4 Arten von Stachelratten des Subgenus *Trinomys*, Genus *Proechimys* beschrieben. Danach kann jede Art eindeutig diagnostiziert werden. Dennoch sind die Bacula von *Proechimys dimidiatus* und *P. iberingi* einander in Form und Ausmaßen ähnlicher, gegenüber denen von *P. setosus* und *P. albispinus* jedoch deutlich verschieden.

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